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| 27061 | 7590 | 11/06/2003 | EXAMINER | |
| ZIOLKOWSKI PATENT SOLUTIONS GROUP, LLC (GEMS) 14135 NORTH CEDARBURG ROAD MEQUON, WI 53097 | | | FETZNER, TIFFANY A | |
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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/682,699

Applicant(s)

BRITTAIN, JEAN HELEN

Examiner

Tiffany A Fetzner

Art Unit

2859

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 August 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-30 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 05 October 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

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09/682,699

Examiner

Tiffany A Fetzner

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DETAILED 3rd Non-Final ACTION

Response to Arguments

1. In view of applicant's August 28th 2003 arguments concerning the **Dietrich et al.**, article "Extending the coverage of true volume scans by continuous movement of the subject" by Olaf Dietrich and Joseph V. Hajnal from The Robert Steiner Magnetic Resonance Unit, Hammersmith Hospital, Du Cane Road, London W120HS 1999. The arguments are persuasive and therefore the **Dietrich et al.**, article is no longer being applied by the examiner as prior art against the claims of applicant's invention.
2. Applicant's arguments filed August 28th 2003 have been fully considered but they are not persuasive, because Applicant is arguing features which are not positively recited in applicant's claims. Applicant argues that the feature of repeatedly exciting and encoding spins with readout in the first direction is a feature of novelty. However applicant has not initially defined or selected the exciting and encoding of the NMR spins **to occur with readout in the first direction**, (i.e. actually "continuously moving the optimal imaging volume and an imaging object in the first direction" **with readout**; is not claimed. Given applicant's argument there is a step missing in each of the applicant's independent claims. If the fact that the readout occurs in the first direction of continuous motion is applicant's argued feature of novelty, this feature needs to be positively recited in all of the independent claims.
3. Applicant's argument for reconsideration of the declaration accompanying the response of April 18th 2003 is persuasive, and upon further review of the declaration, the declaration submitted with the April 18th 2003 response is now considered to be

acceptable and to satisfy the requirements of 37 CFR 1.131 (b); because paragraph 3 on page one of the declaration states that the applicant *conceived of the invention "prior to September 21st 2001"*.

4. The arguments presented on page 5 of the April 18th 2003 amendment response concerning the **Yoshitome H6-311977** reference is persuasive therefore the rejection of **claim 1** for this reference has been rescinded.

Response to Amendment

5. The declaration filed on April 18th 2003 under 37 CFR 1.131 has been reconsidered as per applicant August 28th 2003 amendment request and is upon further review effective to overcome the **Machida** reference, therefore the **Machida** reference is no longer available or applicable as prior art against the claims of applicant's invention.

Drawings

6. The objections to **Figures 1-7** from the February 13th 2003 office action, that **Figures 1-7** should be designated by a legend such as --Prior Art-- are rescinded in view of applicant's April 18th 2003 response.

Provisional Double Patenting

7. **Claims 1,5, 6, 7, 8, 10, 12-15, 16-18, 20, 22, 24-26 and 29** of this application conflict with **claims 1, 10-14, 16-18, 21, 24, 30, 39** of Application No. 10/235,454. 37 CFR 1.78(b) provides that when two or more applications filed by the same applicant contain conflicting claims, elimination of such claims from all but one application may be required in the absence of good and sufficient reason for their retention during pendency in more than one application. Applicant is required to either cancel the conflicting claims from all but one application or maintain a clear line of demarcation between the applications. See MPEP § 822.

8. **Claims 1,5, 6, 7, 8, 10, 12-15, 16-18, 20, 22, 24-26 and 29** are provisionally rejected under the judicially created doctrine of double patenting over **claims 1, 10-14, 16-18, 21, 24, 30, 39** of copending Application No. 10/235,454. This is a provisional double patenting rejection since the conflicting claims have not yet been patented.

9. The subject matter claimed in the instant application is fully disclosed in the referenced copending application and would be covered by any patent granted on that copending application since the referenced copending application and the instant application are claiming common subject matter, as follows:

A) "A method of imaging large volumes without resulting slab-boundary artifacts comprising: defining a desired FOV larger than an optimal imaging volume of an MR scanner;

B) selecting a slab thickness in a first direction that is smaller than the desired FOV and within the optimal imaging volume of the MR scanner; and

C) continuously moving one of the optimal imaging volume and an imaging object in the first direction while repeatedly exciting and encoding spins with readout in the first direction to acquire data that is restricted to the selected slab thickness until at least one image of the FOV can be reconstructed." Each of these limitations are claimed in the independent claims of copending Application No. 10/235,454. There are also some dependent features, which overlap. The provisional double patenting is from the 09/682,699 application to the copending Application No. 10/235,454. Furthermore, since the Application No. 10/235,454 is a continuation of the instant 09/682,699 application there is no apparent reason why applicant would be prevented from presenting claims corresponding to those of the instant application in the other copending application.

Terminal disclaimer will not resolve the Provisional Double patenting Issue

10. The examiner contacted applicant's attorney on October 23rd, 2003; October 27th 2003; and October 29th 2003, to request a terminal disclaimer to overcome the issue of provisional double patenting between the instant application, and the continuation of this application (i.e. co-pending US application 10/235,454) the examiner was informed, by applicant's attorney J. Mark Wilkinson Reg. No. 48,865 that the instant application, and the co-pending US application 10/235,454, which share **Jean Helen Brittain** as an inventor are not commonly owned and are not commonly assigned. Therefore, the issue of non-statutory obvious provisional double patenting is an outstanding issue in this application. The examiner notes that because the two co-pending applications which share a common inventor are not commonly owned and are not commonly assigned that a terminal disclaimer cannot be filed to overcome the rejection.

Claim Rejections - 35 USC § 112

11. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

12. **Claim 30** recites the limitation "selecting a larger slab thickness than that used for imaging" in lines 2 and 3. There is insufficient antecedent basis for this limitation in the claim.

13. **Claim 30** is rejected to because there is no antecedent basis support for the limitation of "selecting a larger slab thickness than that used for imaging", because **claim 22** does not recite a slab thickness used for imaging, there for the limitation of "selecting a larger slab thickness than that used for imaging", and "repetitiously acquiring MR data for the larger slab thickness" lacks antecedent basis. Applicant also defines "optimal image volume" to be distinct from "slab thickness" in the disclosure therefore at least one method step which provides proper antecedent basis is missing from claim 30, additionally if applicant resolves the antecedent basis problem applicant by amendment there will still be an issue of which slab thickness the applicant uses to determine the "overlapping data set" because the relevancy of the Prior art, and the last feature of **claim 30** is dependent upon a proper clarification of which slab thickness is overlapped.

New Art applied due to procedural rule change for effective date of a reference.

14. As a result of a change in procedural rules concerning the effective date of a reference that recently occurred and is ***immediately effective*** to all currently pending US patent applications before the office, (i.e. the Intellectual Property and High Technology Technical Amendments Act of 2002 (H. R. 2215). the prior art of **Kruger et al.**, Patent Application Publication US 2002/0173715 A1 published November 21st

2002; which was not previously available as prior art, (i.e. due to its publication date), **is now a valid prior art reference** against the instant application with an effective date of April 9th 2001, which is the date that the **Kruger et al.**, US provisional application 60/282,555 was filed. The examiner notes that the **Kruger et al.**, application's US filing date is November 26th 2001, but its **effective priority date** as a result of the policy change **is April 9th 2001**, and **April 9th 2001** is the effective date of the reference, used by the examiner in applying this prior art reference. Therefore the following **Non-final** rejections given below are now applicable, and must be applied by the examiner.

15. The examiner notes that all **previous prior-art rejections have been overcome** by applicant's arguments and an effective declaration, therefore only the prior art rejections given below which are **non-final** based on art that was previously unavailable as prior art, and is now relevant prior art remain as art issues in the instant application.

Claim Rejections - 35 USC § 102

16. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(f) he did not himself invent the subject matter sought to be patented.

17. **Claims 1-30** are rejected under **35 U.S.C. 102(f)** because the applicant did not invent the claimed subject matter. The instant application is listed in the USPTO electronic system as a continuation of 09/681,420 whose inventive entity is **Jean Helen Brittain** and **John M. Pauly**, however only **Jean Helen Brittain** is listed as the inventive entity of the instant application. Additionally, co-pending US application 10/235,454 is listed as a continuation of the instant application, however the inventive entity of the 10/235,454 case is also listed as **Jean Helen Brittain** and **John M. Pauly**.

The lack of **John M. Pauly** as an inventor of the instant application in a continuation application is the cause of the inventorship issue.

Claim Rejections - 35 USC § 103

18. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

19. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

20. **Claims 1-30** are rejected under **35 U.S.C. 103(a)** as being unpatentable over **Kruger et al.**, US patent application Publication 2002/0173715 A1 published November 21st 2002; filed November 26th 2001, with an effective date of April 9th 2001.

21. With respect to **Claim 1**, **Kruger et al.**, teaches and suggests "A method of imaging large volumes without resulting slab-boundary artifacts comprising: defining a desired FOV larger than an optimal imaging volume of an MR scanner;" [See **Kruger et al.**, **abstract** page 1 paragraphs 0010, page 2 paragraphs 0019,] The **Kruger et al.**, reference lacks explicitly teaching the term "optimal imaging volume", however **Kruger et al.**, teaches a 3D MR acquisition [See paragraph [0020] on page 2] and that the FOV capable of being imaged is many times larger than the static field of view allowed by a

typical MRI scanner. [See page 2 paragraphe [0019]. Therefore the examiner is interpreting “the static field of view allowed by a typical MRI scanner” to be intrinsically equivalent to the applicant’s claimed “optimal imaging volume”, because a 3D field of view is a 3D imaging volume, and the amount allowed corresponds to applicant’s claimed “optimal” amount. It would have been obvious to one of ordinary skill in the art, at the time that the invention was made that the **Kruger et al.**, reference, suggests an “optimal imaging volume, even though the exact terminology is lacked because the **Kruger et al.**, reference, strives to obtain optimal imaging throughout the reference. [See paragraph [0010] through paragraph [0063]].

22. The **Kruger et al.**, reference also teaches, shows, and suggests “selecting a slab thickness in a first direction that is smaller than the desired FOV and within the optimal imaging volume of the MR scanner;” [See **Kruger et al.**, paragraph [0020] where slab 12 figure 3 is smaller than the desired FOV (i.e. FOV_{tot}) and within the “optimal imaging volume” (i.e. FOV_x); Figures 3, 4, 5, 6; paragraph [0020] through [0022]; paragraphs [0037] through [0038] paragraphs [0060 and [0061]] “and continuously moving one of the optimal imaging volume and an imaging object in the first direction while repeatedly exciting and encoding spins with readout in the first direction to acquire data that is restricted to the selected slab thickness until at least one image of the FOV can be reconstructed”. [See **Kruger et al.**, paragraph [0010] through paragraph [0063] as this limitation itself is the entire focus of the **Kruger et al.**, reference.].

23. With respect to **Claim 2**, **Kruger et al.**, teaches, shows and suggests “the step of using another set of MR data to track motion of one of the optimal imaging volume and an imaging object”. [See **Kruger et al.**, paragraph [0039] through paragraph [0063] abstract; Figures 3 through 6;] The same reasons for rejection, and obviousness that apply to **claim 1** also apply to **claim 2**.

24. With respect to **Claim 3, Kruger et al.**, teaches, and suggests “reconstructing the acquired data to form at least one of a 2D image and a 3D image.” [See **Kruger et al.**, page 2 paragraphs [0020], [0023], and [0039]-[0043] where the use of two-dimensional or three-dimensional Fourier image reconstruction directly suggests the reconstruction of “at least one of a 2D image and a 3D image”.] The same reasons for rejection, and obviousness that apply to **claim 1** also apply to **claim 3**

25. With respect to **Claim 4, Kruger et al.**, teaches, and suggests “the step of using a portion of the acquired MR data to track motion of one of the optimal imaging volume and an imaging object.” [See **Kruger et al.**, page 4 paragraph 0039 through page 5 paragraph 0056] The same reasons for rejection, and obviousness that apply to **claim 1** also apply to **claim 4**.

26. With respect to **Claim 5, Kruger et al.**, teaches, shows, and suggests “restricting data acquisition by encoding and filtering data so as to acquire data that is limited to the selected slab thickness.” [See **Kruger et al.**, page 3 paragraph [0037], page 5 paragraph [0060]; page 2 paragraphs [0020] and [0021] Figures 3, 4, 5, and 6] The same reasons for rejection, and obviousness that apply to **claim 1** also apply to **claim 5**.

27. With respect to **Claim 6, Kruger et al.**, suggests “restricting excitation in at least one direction other than the first direction.”, because in **Kruger et al.**, excitation is restricted to slab 12 which has defined boundaries in the x, y, and z directions defined by the pulse sequence and shown in Figure 3] [See **Kruger et al.**, figure 3 and page 3 paragraph [0037]]. The same reasons for rejection, and obviousness that apply to **claim 1** also apply to **claim 6**.

28. With respect to **Claim 7, Kruger et al.**, teaches, shows, and suggests that “the first direction is defined as a z-direction.”, because slab selection pulse 222 occurs

along the z gradient axis of the pulse timing diagram of figure 2.[See **Kruger et al.**, figure 3 and page 3 paragraph [0037] and figure 2.] The same reasons for rejection, and obviousness that apply to **claim 1** also apply to **claim 7**.

29. With respect to **Claim 8**, **Kruger et al.**, teaches, shows, and suggests “each MR data acquisition during continuous movement includes acquiring all k-space data in a direction of motion of a patient table for a selected subset of transverse k-space data.” [See **Kruger et al.**, page 3 paragraph [0039] through page 6 paragraph [0063]; abstract, paragraphs [0019 through [0031]] The same reasons for rejection, and obviousness that apply to **claim 1** also apply to **claim 8**.

30. With respect to **Claim 9**, **Kruger et al.**, teaches, shows, and suggests “reducing, exam time by imaging during table motion.” [See **Kruger et al.**, page 5 paragraph [0061];]. The same reasons for rejection, and obviousness that apply to **claim 1** also apply to **claim 9**.

31. With respect to **Claim 10**, **Kruger et al.**, teaches, shows, and suggests “processing the set of MR data using a gridding reconstruction”. [See **Kruger et al.**, paragraph [0023] through [0031]; paragraphs [0041] through [0063]; and Figure 6] The same reasons for rejection, and obviousness that apply to **claim 1** also apply to **claim 10**.

32. With respect to **Claim 11**, **Kruger et al.**, teaches, shows, and suggests “the step of maintaining a position of slab thickness fixed relative to a magnet of the MR scanner during imaging of the desired FOV and the continuous moving of one of the optimal imaging volume and the imaging object. [See **Kruger et al.**, page 1 paragraphs [0010 through 0012] page 2 paragraph [0023] through [0031]; page 4 paragraphs [0041] through page 6 paragraph [0063]; and Figure 6] The same reasons for rejection, and obviousness that apply to **claim 1** also apply to **claim 11**.

33. With respect to **Claim 12**, **Kruger et al.**, teaches, shows, and suggests "applying gradient waveforms on an axis parallel to the first direction while acquiring imaging data." [See **Kruger et al.**, page 2 paragraphs [0020] and page 3 paragraph [0037] in combination with figure 2] The same reasons for rejection, and obviousness that apply to **claim 1** also apply to **claim 12**.

34. With respect to **Claim 13**, **Kruger et al.**, teaches, and suggests "processing MR data to account for accrued phase resulting from table velocity; [See **Kruger et al.**, paragraphs [0041] through [0063]] "transforming MR data in a z-direction;" [See **Kruger et al.**, page 2 paragraph [0023]] "correcting the MR data for spatial variations in the magnetic field in the direction of motion" [See **Kruger et al.**, [0024] through [0063]] "removing unnecessary data at the beginning and ending of each acquisition;" is suggested from the partial acquisition scheme of paragraphs [0052 through [0063]; and "sorting, interpolating, and aligning the transformed MR data to match anatomic locations in the first direction." [See **Kruger et al.**, paragraph [0023] through [0031]; paragraphs [0041] through [0063]; and Figure 6] The same reasons for rejection, and obviousness that apply to **claim 1** also apply to **claim 13**.

35. With respect to **Claim 14**, **Kruger et al.**, teaches, "reconstructing an MR image by transforming the z-transformed MR data in remaining transverse dimension(s)." [See **Kruger et al.**, page 2 paragraph [0023] The same reasons for rejection, and obviousness that apply to **claims 1, 13** also apply to **claim 14**.

36. With respect to **Claim 15**, **Kruger et al.**, teaches, and suggests "griddling the transformed MR data in dimension(s) perpendicular to the first direction to reconstruct an MR image. [See **Kruger et al.**, paragraph [0023] through [0031]; paragraphs [0041] through [0063]; and Figure 6]]. The same reasons for rejection, and obviousness that apply to **claims 1, 13** also apply to **claim 15**.

37. With respect to **Claim 16**, **Kruger et al.**, teaches, and suggests "An MRI apparatus to acquire multiple sets of MR data with a moving table and reconstruct MR images without slab-boundary artifacts" [See abstract, paragraphs [0010] through [0011] and paragraphs [0019] through [0023]] "comprising: a magnetic resonance imaging (MRI) system having a plurality of gradient coils positioned about a bore of a magnet to impress a polarizing magnetic field, [See **Kruger et al.**, Figures 1, 2, page 2 paragraph [0019] through paragraph [0020] page 3 paragraph [0032] through [0034] "and an RF transceiver system and an RF switch controlled by a pulse module to transmit RF signals to an RF coil assembly to acquire MR images" [See **Kruger et al.**, Figure 1 page 3 paragraph [0035] through paragraph [0036] "a patient table movable fore and aft in the MRI system about the magnet bore" [See **Kruger et al.**, Figure 1, page 3 paragraph [0033], Figure 1] "and a computer" [See **Kruger et al.**, Figure 1 page 3 paragraph [0032] through [0035] **Kruger et al.**, teaches, and suggests that the computer is programmed to: "receive input defining a desired FOV larger than an optimal imaging volume of the MRI system;" for the same rejection reasons, and reasons for obviousness given in the rejection of **claim 1**, which need not be reiterated.

38. **Kruger et al.**, also shows and suggests the step of defining "a fixed slab" (i.e. slab 12 of figure 2) "with respect to the magnet to acquire MR data, acquire full MR data with frequency encoding in a direction of table motion, defined as z-direction, for a selected subset of the MR data acquired in at least one transverse dimension in the fixed slab; continuously move the patient table while maintaining position of the fixed slab; determine patient table position; and repeat the acquire and determine acts while the patient table is moving until an MR data set is acquired across the desired FOV to reconstruct an image of the FOV", [See **Kruger et al.**, page 3 paragraph [0032] through page 6 paragraph [0063]; page 2 paragraphs [0019] through [0023] Figures 1 through 6;

abstract, and page 1 paragraphs [0010] and [0011]] Additionally, the same reasons for rejection, that apply to **claim 1**, also apply to **claim 16** and need not be reiterated.

39. With respect to **Claim 17**, **Kruger et al.**, teaches, and suggests “the computer is further programmed to transmit magnetic gradient waveforms to encode a k-space trajectory that is uniform in kz” [See **Kruger et al.**, paragraphs [0034], [0037] – [0061] page 3 paragraph 0040 through page 6 paragraph 0088; Figures 1-6] The same reasons for rejection, that apply to **claims 1, 16**, also apply to **claim 17** and need not be reiterated.

40. With respect to **Claim 18**, which is the apparatus version of **claims 7, 13, and 14** combined **Kruger et al.**, teaches, and suggests that “the computer is further programmed to transform MR data with respect to z; align the z-transformed MR data to match anatomy across slab boundaries; and transform the z-transformed MR data with respect to at least one remaining dimension to reconstruct an MR image”, for the same reasons provided in the rejections of **claims 7, 13, and 14** of for rejection, that need not be reiterated therefore the same reasons for rejection, that apply to **claims 1, 7, 13, 14, and 16**, also apply to **claim 18**.

41. With respect to **Claim 19**, this claim (i.e. “applying an RF pulse to excite a volume of interest; applying a k-space trajectory to encode the volume of interest, and filtering the acquired MR data to restrict the MR data to the defined fixed slab”) is just an equivalent version of method **claim 5** in apparatus form, therefore the same reasons for rejection, that apply to **claims 1, 5, and 16**, also apply to **claim 19** and need not be reiterated.

42. With respect to **Claim 20**, **Kruger et al.**, teaches, shows and suggests “continuously moving the patient table to acquire the MR data set across the desired FOV.” [See **Kruger et al.**, abstract page 1 paragraph [0010] through page 6 paragraph

[0063]; Figures 1, 3, 4-6] The same reasons for rejection, that apply to **claims 1, 16**, also apply to **claim 20** and need not be reiterated.

43. With respect to **Claim 21, Kruger et al.**, teaches, shows and suggests “acquiring all kz data for a selected subset of transverse k-space data,” [See paragraph [0020], paragraph [0038], paragraph [0043] figures 3, 4, 6] “defining a set of magnetic field gradient waveforms to incrementally encode and acquire data in a given slab;” [See Paragraphs [0034]-[0038]; paragraphs [0019]-[0023]] “and applying the set of magnetic field gradient waveforms in a cyclic order.” [See Paragraphs [0034]-[0038]; paragraphs [0019]-[0023]] The same reasons for rejection, that apply to **claims 1, 16**, also apply to **claim 21** and need not be reiterated.

44. With respect to **Claim 22, Kruger et al.**, teaches, shows and suggests “computer program to control a medical image scanner and create images across scanning boundaries without boundary artifacts” [See figure 1, abstract, paragraphs [0010] through [0011] and paragraphs [0019] through [0023]] “the computer program having a set of instructions to control a computer to: select an FOV spanning an area greater than a predefined optimal imaging area of the medical image scanner;” for the same rejection reasons, and reasons for obviousness given in the rejection of **claim 1**, which need not be reiterated. **Kruger et al.**, teaches, and suggests the step of “applying an RF pulse to excite a region in at least a first direction in the selected FOV” [See **Kruger et al.**, paragraph [0034] through [0037]; paragraphs [0019 through [0023]; paragraphs [0010]-[0011]] “apply magnetic field gradients to encode the region in the first direction;” [See **Kruger et al.**, paragraph [0034] through [0037]; paragraphs [0019 through [0023]; paragraphs [0010]-[0011]] “acquire k-space data in the first direction for a subset of at least one additional direction;” [See **Kruger et al.**, page 2 paragraph [0019] through page 6 paragraph [0063]; “continuously reposition the predefined optimal imaging area

with respect to an imaging object without interruption of motion;" [See **Kruger et al.**, page 4 paragraph [0040] through page 6 paragraph [0063]; Figures 1-6 in combination with one another] "track continuous movement of the predefined optimal imaging area with respect to an imaging object;" [See **Kruger et al.**, figure 6 page 4 paragraph [0040] through page 6 paragraph [0063]; "and repeat the image data acquisition during continuous movement of the predefined optimal imaging area with respect to an imaging object until complete image data are acquired across the entire FOV to reconstruct an image of the FOV". [See **Kruger et al.**, figure 6 page 4 paragraph [0040] through page 6 paragraph [0063]; The same reasons for rejection, that apply to **claims 1, 16**, also apply to **claim 22** and need not be reiterated.

45. With respect to **Claim 23**, **Kruger et al.**, teaches, shows and suggests "the k-space data includes either one of 2D or 3D k-space data"[See **Kruger et al.**, page 3 paragraph [0020], [0023], [0054], [0061] "and having further instructions to acquire the k space data using frequency encoding in a direction of table movement". [See **Kruger et al.**, paragraphs [0020], [0021], Figures 3, 4, and 6] The same reasons for rejection, that apply to **claims 1, 16, 22** also apply to **claim 23** and need not be reiterated.

46. With respect to **Claim 24**, **Kruger et al.**, teaches, shows and suggests "complete k-space data is acquired in z for a subset of at least one additional dimension." [See paragraph [0020], paragraph [0038] through paragraph [0043] figures 3, 4, 6] The same reasons for rejection, that apply to **claims 1, 16, 22, 23** also apply to **claim 24** and need not be reiterated.

47. With respect to **Claim 25**, **Kruger et al.**, teaches, shows and suggests "continuously moving a patient table for a number of acquisitions until a set of k space data are acquired for image reconstruction of a given slab." [See **Kruger et al.**, abstract,

page 1 [paragraph 0010] through page 6 paragraph [0063]; Figures 1 through 6] The same reasons for rejection, that apply to **claims 1, 16, 22** also apply to **claim 25** and need not be reiterated.

48. With respect to **Amended Claim 26, Kruger et al.**, teaches, shows and suggests “Fourier transforming image data in z;” [See **Kruger et al.**, abstract, page 2 paragraph [0020], [0054], because MR data is a type of image formation data]; “sort and align the z-transformed MR data to match anatomic locations in z to fill a matrix.” [See **Kruger et al.**, page 4 paragraph [0040] through page 6 paragraph [0063]; Figures 1, 3, 4, and 6] The same reasons for rejection, that apply to **claims 1, 16, 22** also apply to **claim 26** and need not be reiterated.

49. With respect to **Claim 27, Kruger et al.**, teaches, shows and suggests “maintaining a position of a slab thickness fixed, relative to a magnet of the medical image scanner, during the imaging of the desired FOV and while repositioning the optimal imaging area” [See **Kruger et al.**, figures 3, 4, 6 paragraphs [0038] through [0063]; paragraphs [0019]-[0023]; paragraphs [0010]-[0012]] Additionally, this claim is just an equivalent version of method **claim 11** in apparatus form, therefore the same reasons for rejection, that apply to **claims 1, 11, 16, 22** also apply to **claim 27** and need not be reiterated.

50. With respect to **Claim 28, Kruger et al.**, teaches, shows and suggests “the first direction is a z direction” [See page 2 paragraph [0020] and page 3 paragraph [0037] in combination] “and the MR data acquired in the z-direction is represented in a number of retained pixels, and where MR data is acquired every sequence repetition and during table movement, and wherein the magnetic field gradients encode a trajectory that is uniform in kz”. [See **Kruger et al.**, page 1 paragraph [0010] through page 6 paragraph

[0063]; Figures 1-6] The same reasons for rejection, that apply to **claims 1, 16, 22** also apply to **claim 28** and need not be reiterated.

51. With respect to **Claim 29, Kruger et al.**, teaches, shows and suggests "acquiring all kz data for a selected subset of transverse k-space; defining a set of magnetic field gradient waveforms to incrementally acquire data in each slab; and applying the set of magnetic field gradient waveforms over each slab." [See **Kruger et al.**, paragraph [0037] through paragraph [0063]] The same reasons for rejection, that apply to **claims 1, 16, 22** also apply to **claim 29** and need not be reiterated.

52. With respect to **Claim 30, Kruger et al.**, suggests that the computer functions to "select a larger slab thickness than that used for imaging;" [See **Kruger et al.**, paragraphs [0019] through [0023]; figures 3, 4, 6; paragraphs [0010]-[0011]; [0040] through [0063]] repetitiously acquire MR data for the larger slab thickness in the direction of table movement; ;" [See **Kruger et al.**, paragraphs [0040] through [0063]] 'determine a set of overlapping data;" [See **Kruger et al.**, paragraphs [0050] through [0063]] "and estimate at least one of table velocity and table position from the set of overlapping MR data." [See **Kruger et al.**, paragraphs [0050] through [0063]] The same reasons for rejection, that apply to **claims 1, 16, 22** also apply to **claim 30** and need not be reiterated.

53. The **prior art made of record** and not relied upon is considered pertinent to applicant's disclosure.

A) Wang US patent 5,928,148 issued July 27th 1999.

B) Yoshitome Japanese Laid-open Patent Application (kokai) No. H6-304153 disclosed November 1st 1994. [The examiner is using the English version of this reference provided by applicant and submitted with applicant's Information Disclosure Statement].

C) Yoshitome Japanese Laid-open Patent Application (kokai) No. H6-311977 disclosed November 8th 1994. [The examiner is using the English version of this reference provided by applicant and submitted with applicant's Information Disclosure Statement].

D) Machida US Patent Application Publication US 2002/0115929 A1 published August 22nd 2002 which has an effective filing date available under 35 U.S.C. 102(e) of September 21st 2001 is not available as prior art against the instant application because applicant's declaration under 37 CFR 1.131 effectively disqualifies the **Machida** reference as prior art, therefore the **Machida** reference is not prior art against the claims of the instant application.

E) The Dietrich et al., article "Extending the coverage of true volume scans by continuous movement of the subject" by Olaf Dietrich and Joseph V. Hajnal from The Robert Steiner Magnetic Resonance Unit, Hammersmith Hospital, Du Cane Road, London W120HS 1999.

F) Brittain US Patent Application Publication US 2002/0140423 A1 published October 3rd 2002, which is the corresponding publication of applicant's instant application, therefore this application is not available as prior art, but is noted only for the purposes of a complete record.

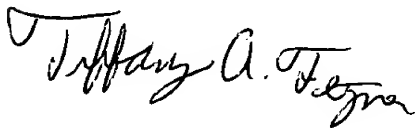
G) **Brittain** US Patent Application Publication 2003/0011369 A1 published January 16th 2003, which is the corresponding publication of applicant's co-pending continuation application, 10.235,454 and therefore is not available as prior art, but is noted only for the purposes of a complete record.

Conclusion

54. Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Tiffany Fetzner** whose telephone number is **(703) 305-0430**. The examiner can normally be reached on Monday-Thursday from 7:00am to 4:30pm., and on alternate Friday's from 7:00am to 3:30pm.


55. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, **Diego Gutierrez**, can be reached on **(703) 308-3875**. The fax phone number for the organization where this application or proceeding is assigned is (703)305-3432 .

56. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-0956.



TAF

11/03/2003



Diego Gutierrez

Supervisory Patent Examiner

Tech Center 2800